Welcome to Biology at A-Level! You are about to embark on a learning journey involving many different aspects of Biology! Studying at A-Level is a challenge, but it also gives you the opportunity to develop really important independent learning skills. You have chosen your subjects and at this level, you can really start to take charge of your own learning.

This bridging unit is designed to help you do just that. The Biology bridging unit is designed to help you investigate some key areas of study and to ensure that you have a secure understanding of the GCSE work undertaken and to start extending this to requirements of A-level. This unit is an opportunity for you to find out what you can do and we hope you enjoy it. You should be ready to hand in your project when you start your course in September.

In this pack you should find:-

- The seven principles of learning at Sixth Form level
- A guidance sheet about your task setting out what to do.
- A list of levels showing you the skills you are developing.
- Research sources.

Your A-Level Biology Course

Year 1 - AS Biology

► Module 1 - Development of practical skills in biology
► Module 2 – Foundations in biology
► Module 3 – Exchange and transport
► Module 4 – Biodiversity, evolution and disease

Year 2 - A level biology

► Module 5 - Communication, Homeostasis and energy
► Module 6 - Genetics, evolution and ecosystems
Year 1 – AS Biology

**Module 1**
- Practical skills

**Module 2**
- Cell structure, biological molecules, nucleotides and nucleic acids, enzymes, biological membranes, cell division, diversity and organisation

**Module 3**
- Exchange surfaces, transport in plants and animals

**Module 4**
- Communicable disease, disease prevention, the immune system, biodiversity, classification and evolution

Year 2 – A level Biology

**Module 5**
- Communication and homeostasis, excretion, neuronal/hormonal communication, plant and animal responses, photosynthesis and respiration

**Module 6**
- Cellular control, patterns of inheritance, manipulating genomes, cloning and biotechnology, ecosystems, populations and sustainability
Year 1 - AS Biology

**Breadth in biology (1hr 30min)**
- 70 marks / 50% of AS grade
- 2 sections
  - Section A (20 marks)
    - multiple choice questions
  - Section B (50 marks)
    - Short answer
    - Structures, problem solving, calculations and practical based questions

**Depth in biology (1hr 30min)**
- 70 marks / 50% of AS grade
- Short answer, structured, problem solving, calculations and practical based questions
- Questions from all modules in both papers

---

Year 2 - A level Biology

**Biological processes (2hr 15)**
- Content from modules 1, 2, 3 & 5
- 100 marks / 37% of A level
- Multiple choice (15 marks) and short & extended answer questions (85 marks)

**Biological diversity (2hr 15)**
- Content from modules 1, 2, 4 & 6
- 100 marks / 37% of A level
- Multiple choice (15 marks) and short & extended answer questions (85 marks)

**Unified biology (1 hr 30)**
- Content from modules 1-6
- 70 marks / 26% of A level
- Short and extended answer questions

---

Practical endorsement in Biology

- **Module 1 - Development of practical skills in biology**
- Will be taught throughout the course
- Practical assessment will be undertaken throughout the course
- Your lab book will be moderated by the teacher and may be externally assessed
The Seven Principles of Learning

Remember you learn best when:-

1. Use your initiative, have a go and clarify later; it’s your ideas that matter.

2. Take a risk and be creative.

3. Talk about what you are learning and what you know.

4. Work together to explore how you would solve a problem.

5. Reflect on your needs and how you learn best in terms of interests, abilities and styles of learning. Make changes if necessary.

6. Respond positively to feedback from your teachers and your peers.

7. Take responsibility for your own learning.

SOURCE: ROBERT BRADLEY & COLLEAGUES AT NORBURY MANOR BUSINESS & ENTERPRISE COLLEGE FOR GIRLS
**Module 2 Guidance**

For Module 2 and 3 you will be learning about the cell organelles and their functions, how unicellular organisms and multicellular organisms interact with their environment and exchange gases and nutrients. To prepare for these module you will need to investigate the importance of size and surface area; transport of nutrients in both a plant and animal cell; the breathing system and circulatory system in humans. You will need to ensure that your GCSE knowledge is good and extend that knowledge to incorporate A-level quality information.

Your task over the summer holidays is to present your findings on the four topics listed on the following pages.

🌟 You may present your work in any format (poster, essay, diagrams) but the questions must be answered fully and use the correct scientific terminology.

You must provide references for the information used and ensure that the work is your own rather than copied directly from the source.
Your Task

Topic 1 – Size and the surface area to volume ratio

Find out why surface area is important for exchange in living organisms. Include gaseous exchange and body temperature. Explain how the size of an organism affects the surface area to volume ratio.

Answer the following questions with full sentences.
1. Which has the bigger surface area to volume ratio, a small organism or a large organism?
2. Which process produces a lot of heat in mammalian cells?
3. In the Arctic which animal will find it easier to keep warm – an adult male polar bear or an adult male arctic fox? Explain your answer.

Topic 2 – Plant and animal cells

Describe the differences between plant and animal cells. Find out about the structure of the cell membrane including the phospholipid molecules and carrier proteins. Why are the membrane important? Include a description of the following processes:

*Diffusion  * facilitated diffusion  * osmosis  *active transport

Find out about the differences between light microscopes and light microscopes.

Include the answers to the following questions:

1) Name 3 things visible with a light microscope in both animal and plant cells
2) Which type of microscope must be used to show the detail inside a cell
3) What is an electron micrograph?
4) DNA is found in which organelle?
5) How could you distinguish a eukaryotic cell from a prokaryotic cell?
6) In which organelle does aerobic respiration occur?
7) Write the word equation for aerobic respiration
8) The long, straight molecules of which substance provide strength in the cell wall of plant cells?
9) Name the two types of molecule that make up the cell membrane
10) Name three ways substances can cross cell membranes
11) What do we call the diffusion of water molecules through the cell membrane?
12) What is a partially permeable membrane?
13) What must the cell provide for active transport?
14) Which molecule, produced in the mitochondria, is the immediate source of energy for cells?
15) Large numbers of which organelle would be present in a cell that actively transports a lot of glucose across its membrane? Explain your answer.

**Topic 3 – The Breathing System**

Find out about the different structures within the breathing system. Describe how the alveoli are adapted to increase the rate of diffusion of the respiratory gases. Explain why water can cause problems in the alveoli. Describe what happens to the intercostal muscles, diaphragm, thorax volume and pressure when we a) inhale and b) exhale.

Include the answers the following questions:

1. In which part of the lungs does gas exchange take place?
2. Describe the shape for the cells that make up the walls of the alveoli and explain how their shape suits their function
3. Name three substances that pass easily through the epithelial cell membranes
4. What is a surfactant?
5. Describe the relationship between volume and pressure in an enclosed space.
6. Choose the correct word to complete the following sentence. Air always flows from a region of higher/lower pressure to a region of higher/lower pressure.
7. Which two sets of muscles contract when we breathe in?
8. Does breathing out require energy?
9. What are you eating when you tuck into barbecued spare ribs?

**Topic 4 – The Circulatory System**

Find out why large animals need a circulatory system. What is the structure of the heart like? Describe the sequence of events during one heartbeat (the cardiac cycle). Describe the structure
and function of the arteries, arterioles, capillaries and veins – diagrams to show the differences will help. Describe the role of haemoglobin in the blood and how oxygen and carbon dioxide affect haemoglobin.

Include the answers to the following questions:

1. Explain why a fly maggot does not require a circulatory system
2. Why is the wall of the left ventricle thicker than the wall of the right ventricle?
3. What is the function of the heart valves?
4. Do heart valves require energy to open and close?
5. The sino-atrial noted is sometimes called the heart’s natural pacemaker. What is its function?
6. In which region of the brain would you find the cardioacceleratory and cardioinhibitory centres?
7. What effect do impulses from the cardioinhibitory centre have on the heart rate?
**How will your work be assessed?**

<table>
<thead>
<tr>
<th>Level</th>
<th>Marks</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1     | 1-6   | - General points are correct, but not focused on the question  
          - Lacks supporting evidence  
          Level 1 answers are simplistic, irrelevant or vague |
| 2     | 7-12  | - General points are focused on the question  
          - Some accurate and relevant supporting evidence  
          Level 2 answers might give an idea of structure but key scientific terminology not used. |
| 3     | 13-18 | - General points focus on the question  
          - Accurate supporting information.  
          Level 3 answers attempt to focus on the question but have significant areas of weakness. For example, the focus may drift, the answer may lack specific detail or explanation. |
| 4     | 19-24 | - General points clearly address the question and show understanding of the most important factors involved.  
          - Accurate, relevant and detailed support  
          - Clear, scientific terminology showing an understanding of the definition and how the word should be used.  
          Level 4 answers clearly attempt to answer the question and demonstrate a detailed knowledge of the structures being described as well as linking them with function. |
| 5     | 25-30 | - General points clearly address the question and show understanding of the most important factors involved  
          - Accurate, relevant and detailed support  
          - Clear explanatory links to the question  
          - **Some supported discussion of the importance of factors mentioned.**  
          Level 5 answers are detailed and well organised. They clearly link structure to function when necessary and use examples to support points being made. Links with prior learning and with topics researched are evident. |
Where can I find out information?

The book we will be using for A-level biology is:

‘A Level Biology for OCR -Student Book on Kerbodle by Ann Fullicik

This book will provide you with the key information you need. However you can use any A-level biology book as these are core concepts to any A-level course. Remember that you don’t need to read the entire book – start using contents and index pages to help guide your research.

This is only a suggestion of what to read – there are hundreds of books out there which can give you information to answer this question. Go to the library and do as much research as you can!

A key skill for A-level study, including Biology, is the ability to research around the topic and select only the relevant information. You will find lots of research, not all of which is useful or answers the questions you are researching and it is key that you can select and use evidence to support your answers and investigations.